

AMENDMENTS TO THE CLAIMS

This listing of claims will replace all prior versions and listings of claims in the application:

LISTING OF CLAIMS:

1. - 6. (cancel)

7. (new): A drive circuit of a direct-current voltage-driven magnetic contactor including an operating coil that is capable of direct-current excitation, a main contact that is in an open circuit condition in an attracting period of an initial period of excitation by the operating coil and is in a closed circuit condition in a holding period, the holding period being subsequent to the attracting period, and an auxiliary contact that carries out an opening and closing operation that is reverse with respect to the main contact, and wherein a first end of the operating coil is connected to a positive electrode side of an exciting direct-current power supply and a second end of the operating coil is connected to a first end of the auxiliary contact, the drive circuit comprising:

 a starting semiconductor switching element provided between a second end of the auxiliary contact and a negative electrode side of the exciting direct-current power supply;

 a direct-current power supply voltage detecting circuit that outputs a start instruction signal when an applied voltage of the exciting direct-current power supply exceeds a predetermined value;

 a driving direct-current power supply whose negative electrode side is connected to the negative electrode side of the exciting direct-current power supply;

 a first drive circuit that makes the starting semiconductor switching element perform an

ON operation upon receiving the start instruction signal, using the driving direct-current power supply as an operating power supply;

a charging capacitor whose one end is connected to a positive electrode side of the driving direct-current power supply via a diode, and whose other end is connected to the second end of the auxiliary contact;

a current limiting semiconductor switching element connected in parallel to the auxiliary contact; and

a second drive circuit that makes the current limiting semiconductor switching element perform a switching operation when a terminal voltage of the charging capacitor reaches the predetermined value.

8. (new): The drive circuit according to claim 7, wherein

a current detecting resistor is arranged between the second end of the auxiliary contact and a corresponding terminal of the current limiting semiconductor switching element, and

the second drive circuit monitors a terminal voltage of the current detecting resistor, and carries out control to make the current limiting semiconductor switching element perform an ON/OFF operation at a fixed cycle when the terminal voltage is any one of equal to and less than a prescribed value, and extends an OFF operation period of the current limiting semiconductor switching element when the terminal voltage exceeds the prescribed value.

9. (new): The drive circuit according to claim 7, wherein

a current detecting resistor is arranged between the second end of the auxiliary contact and a corresponding terminal of the current limiting semiconductor switching element,

an RC low-pass filter is provided between the current detecting resistor and the second drive circuit, and carries out an opening and closing operation that is reverse with respect to the main contact, and

the second drive circuit monitors a terminal voltage of the current detecting resistor via the RC low-pass filter, and carries out control to make the current limiting semiconductor switching element perform an ON/OFF operation at a fixed cycle when the terminal voltage is any one of equal to and less than a prescribed value, and extends an OFF operation period of the current limiting semiconductor switching element when the terminal voltage exceeds the prescribed value.

10. (new): A power converter comprising:

a rectifying circuit that forward-converts an inputted alternating-current power to a direct-current power;

a smoothing capacitor that smoothes a forward-converted direct-current power and holds the forward-converted direct-current power as a direct-current bus voltage;

a switching circuit that inverse-converts the direct-current bus voltage to an alternating-current by switching the direct-current bus voltage using semiconductor switching elements; and

an inrush current suppression circuit that is provided between the rectifying circuit and the smoothing capacitor, and that includes a current limiting resistor and a main contact of a

direct-current voltage-driven magnetic contactor connected in parallel, wherein in the direct-current voltage-driven magnetic contactor, a first end of an operating coil capable of direct-current excitation is connected to a positive electrode side of the direct-current bus voltage, a second end of the operating coil is connected to a first end of an auxiliary contact, and a drive circuit of the direct-current voltage-driven magnetic contactor includes

- a starting semiconductor switching element provided between a second end of the auxiliary contact and a negative electrode side of the exciting direct-current power supply,

- a direct-current power supply voltage detecting circuit that outputs a start instruction signal when an applied voltage of the exciting direct-current power supply exceeds a predetermined value,

- a driving direct-current power supply whose negative electrode side is connected to the negative electrode side of the exciting direct-current power supply,

- a first drive circuit that makes the starting semiconductor switching element perform an ON operation upon receiving the start instruction signal, using the driving direct-current power supply as an operating power supply,

- a charging capacitor whose one end is connected to a positive electrode side of the driving direct-current power supply via a diode, and whose other end is connected to the second end of the auxiliary contact,

- a current limiting semiconductor switching element connected in parallel to the auxiliary contact, and

- a second drive circuit that makes the current limiting semiconductor switching

element perform a switching operation when a terminal voltage of the charging capacitor has reached the predetermined value.

11. (new): The power converter according to claim 10, wherein

a current detecting resistor is arranged between the second end of the auxiliary contact and a corresponding terminal of the current limiting semiconductor switching element, and

the second drive circuit monitors a terminal voltage of the current detecting resistor, and carries out control to make the current limiting semiconductor switching element perform an ON/OFF operation at a fixed cycle when the terminal voltage is any one of equal to and less than a prescribed value, and extends an OFF operation period of the current limiting semiconductor switching element when the terminal voltage exceeds the prescribed value.

12. (new): The power converter according to claim 10, wherein

a current detecting resistor is arranged between the second end of the auxiliary contact and a corresponding terminal of the current limiting semiconductor switching element,

an RC low-pass filter is provided between the current detecting resistor and the second drive circuit, and

the second drive circuit monitors a terminal voltage of the current detecting resistor via the RC low-pass filter, and carries out control to make the current limiting semiconductor switching element perform an ON/OFF operation at a fixed cycle when the terminal voltage is any one of equal to and less than a prescribed value, and extends an OFF operation period of the

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current limiting semiconductor switching element when the terminal voltage exceeds the prescribed value.